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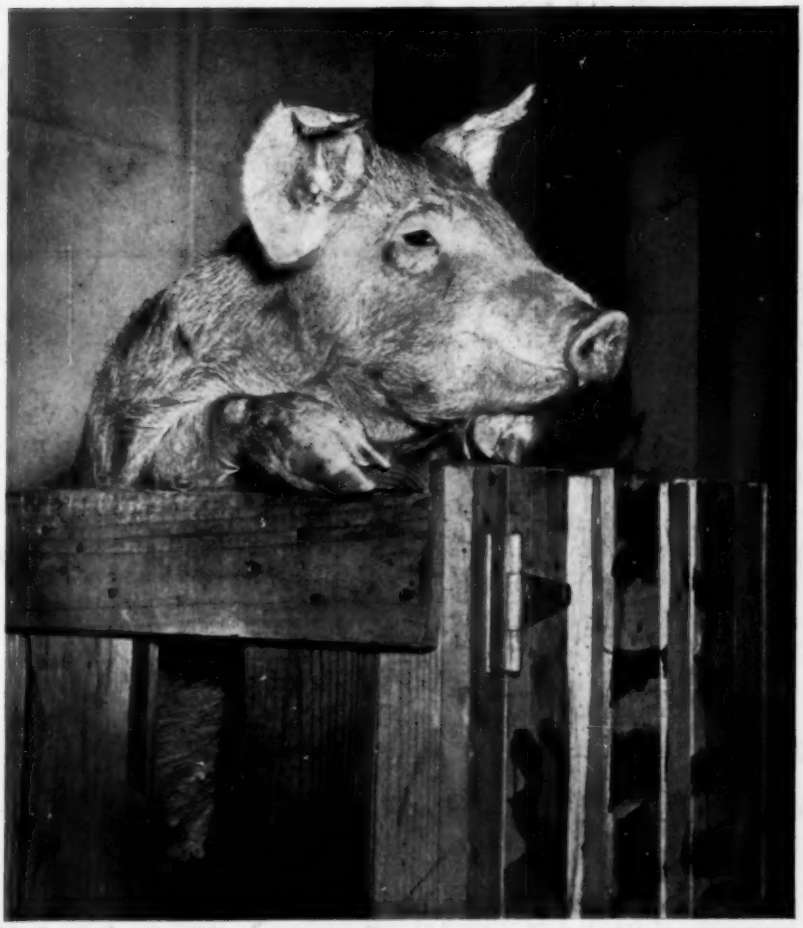
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



May 31, 1941

Vitamin Fed

See Page 339

A SCIENCE SERVICE PUBLICATION

Do You Know?

The average American uses about 250 pounds of *paper* a year.

Some of the armor plate on a 25-ton *tank* is two inches thick.

New England *mistletoe* is so small a plant that botanists overlooked it until 1871.

Long-staple sea-island *cotton* is reported usable for parachutes and airplane wing coverings.

According to recent studies, infectious diseases cause about one-fourth of the *blindness* in this country.

Draperies, carpets and upholstered furniture help to absorb *noise* in rooms and halls that give off hollow sounds.

More than half of the world's *people* live in lands bordering the Indian and Pacific Oceans, a University of California geographer points out.

An old engraving shows the remarkable interior of Ole Worm's *museum* in Copenhagen in the seventeenth century, including an auk, polar bear, flying fish, shells, and other natural wonders.

A new instrument for testing fitness of prospective air *pilots*, described by British scientists, is an electrical multiple-exposure tachistoscope, which measures speed of adjustment of the eyes for change of distance, speed of accommodation and adaptation and which also tests ocular and general fatigue.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in* SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.

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PUBLIC HEALTH-NUTRITION

What proportion of people on relief are aided by the food stamp plan? p. 340.

RESOURCES

Where will quinine come from? p. 345.

Liquid gas is being used to run 69,000 automobiles in Germany, says a report from that country.

In a recent air raid at Leeds, a collection of *birds' eggs* in the city museum survived a 20-foot fall.

One tree 25 inches in diameter brings as much money when sold for *timber* as 24 trees only 13 inches in diameter.

Californians have organized a California *Folklore* Society and will issue a magazine to be published by the University of California Press.

Some of Greenland's *plants* were introduced by Norse colonists in medieval times.

Aristocratic *Indians* of Virginia wore beaver fur, while poorer natives wore deerskins.

After nearly four years of fighting, Japan has gained control of only 20% of *China*, says a Chinese scientist.

"Enriched" bread is no more fattening than ordinary bread, because the vitamins and minerals added do not add extra calories.

SCIENCE NEWS LETTER

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NUTRITION

Diet Standards For Americans Of All Ages Announced

What Old, Young and Middle-Aged Need to Eat for Building Health for Defense Now Worked Out

AMERICA is about to learn exactly which foods and how much of each should be eaten each day for the health and vitality needed to make us strong individually and for defense as a nation.

Standards for planning an adequate diet for Americans of all ages, Mother and Dad, the children, the old folks, the young matron who is expecting or nursing a baby, have been worked out and finally approved by the nation's authorities on nutrition.

The new diet standards are contained in a report by Dr. Russell M. Wilder, of the Mayo Clinic, chairman of the Food and Nutrition Committee of the National Research Council, to Surgeon General Thomas Parran, U. S. Public Health Service.

Diet and food standards have been announced before, but these new ones are planned according to the latest scientific knowledge about foods and their contribution to health, strength and morale. The food standards worked out only a few years ago by a committee of the League of Nations, Dr. Wilder explained, would not serve for our nationwide program of defense on the nutrition front because they are out of date.

When those standards were compiled, the discovery of nicotinic acid as a cure and preventive of pellagra had not been made. Riboflavin, another important member of the vitamin B group, was unknown. The standard set for thiamin, which is morale vitamin B_1, was based on animal diet studies. Studies on humans have recently shown that we need more of this morale vitamin than the animal studies showed.

Actually we need more of the B vitamins than can be readily obtained from modern diets, Dr. Wilder said, because modern refined foods contain relatively little of these vitamins. The use of enriched bread will help in planning diets that will meet the higher requirements now known about, and there are plans for enriching other staple foods to make sure that an adequate diet can be made from foods that are available to everyone.

The new defense diet standards, which are suitable for any time but especially important to follow right now, took a long time to develop. Over a month ago a committee of nutrition authorities were ready to announce them. At that time the standards were stated in terms nutritionists use in their laboratories: grams of protein, fat, carbohydrate, milligrams of vitamins, and the like.

Then, when someone started translating them into bread (*Turn to page 347*)

NUTRITION

Without Thiamin in Diet Pigs Cease to Be Hoggish

See Front Cover

LACK of thiamin (vitamin B_1) changes personality of pigs. Without thiamin they are no longer piggish. The United States Department of Agriculture says more and better pigs, capable of producing good meat, are needed to fill vacancies soon to exist in the defense market.

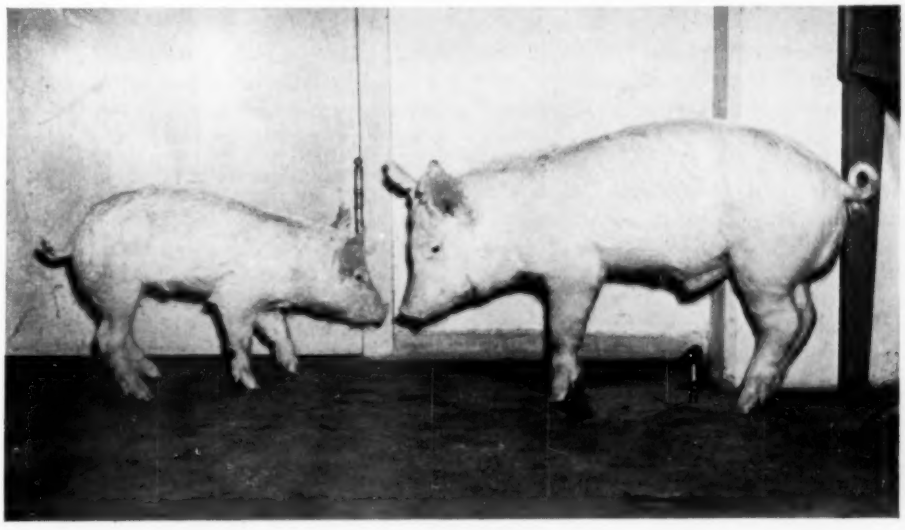
With this in mind, the Beltsville Experimental Farm, near Washington, D. C., is working to reduce the infant mortality rate of pigs. One reason for this large mortality rate may be that little pigs do not get enough thiamin in their diet. N. R. Ellis, Nutrition expert of the U. S. Department of Agriculture, fed part of a litter of pigs a synthetic diet without thiamin, and the rest a diet with thiamin. It was found that pigs lacking thiamin gained weight for a time but then began to lose weight. They developed bad hearts, ran subnormal body temperatures, got weak and died. One suffered from convulsions. There was a noticeable lack of appetite as these pigs became sick.

The other little pigs born at the same time of the same mother, but fed thiamin in their diet, grew well and are healthy.

The pig shown on the cover of this week's SCIENCE NEWS LETTER had a medium thiamin and medium fat diet.

What these pigs demonstrate may possibly have human implications. It has been found, Mr. Ellis said, that contrary to what some biologists believe, thiamin is involved in the use of fat by the body. It is possible to get along with smaller amounts of fat if the amount of thiamin eaten is high. A high fat diet (28%) with 25 mcg. thiamin per kilogram of body weight, seems to be equal to a medium fat diet (12%) with 35 mcg. of thiamin, or a diet containing a minimum of fat (2%) if 40 mcg. of thiamin is taken.

Science News Letter, May 31, 1941



CONTRAST

The big pig had thiamin, the other pig had none. But both were born of the same mother at the same time. The small pig is fed a high fat diet, but deprived of thiamin. The other, three times as heavy, has a low-fat diet but with a high thiamin content in its ration.

PUBLIC HEALTH—NUTRITION

Extension of Food Stamp Plan Raises Question of Food Dole

Increase in Employment and Higher Wages Believed Insufficient to Relieve Undernourishment This Year

EXTENSION of the food stamp plan to all families in the United States with incomes of less than $1000 a year was considered as a nutrition-for-defense measure at the National Nutrition Conference for Defense called by President Roosevelt for May 26, 27 and 28.

This proposal, although being considered as a defense measure now, raises the question of how nearly we are ready as a nation, to consider what might be called a permanent food "dole" for a considerable percentage of the population, in order to insure a minimum standard of nutrition for the entire nation, war or no war.

The number of people eligible for public aid has come down sharply with increased industrial activity because of the defense program. No exact estimates of this number are yet available from any federal government source, but Federal Security Administrator Paul V. McNutt has just stated that increase in employment and higher wages will not be enough to have any pronounced effect on widespread undernourishment in this country this year or next. Because of this, extension of the food stamp plan will be considered as a possible method of improving the health and fitness of the people who are needed to step-up production of airplanes, munitions and ships.

The food stamp plan at present, after two years of pushing ahead as fast as possible, is available to about one-half the families on relief. At the present rate, authorities in charge believe it will take another year or so to extend it to all relief families. The plan increases the family food purchasing ability by one-half. Those eligible can buy a $16 orange stamp per month per person. These stamps can be used only for buying food. With each orange stamp, a free blue stamp is issued which is good for an additional $8 per month per person for food from the current surplus foods.

With one exception, this plan has so far been made available only to families certified by local relief authorities as eligible for some sort of public aid, that is, families whom the social workers have interviewed and continue to interview every three months.

Many people feel that the stamp plan should be extended to those families not on relief but whose income is no higher than that paid through relief agencies to the families on relief. Difficulty of administration is one thing which has held up any such extension of the food stamp plan.

The social worker in direct and frequent contact with the relief families knows when members of the family are employed and no longer eligible for relief. If the food stamp plan were extended to non-relief families there would be no way of knowing, without increasing administrative facilities and personnel, when more members of the family got jobs, or increased wages, and thus no longer had incomes of less than $1000.

Extension of the food stamp plan to families not on relief rolls with incomes of less than $1000 a year has been tried as an experiment in Shawnee, Okla. Between 400 and 500 families are included in this experiment. While it has worked out all right there so far, federal authorities do not believe extension of the food stamp plan throughout the country to families who are not carefully checked and certified would be satisfactory.

The cost of extending the food stamp plan to all families with incomes of less than $1000 as a nutrition-for-defense measure would be approximately $500,000,000 and would benefit some 20,000,000 to 22,000,000 persons, Mr. McNutt stated in announcing that the plan would be considered at the coming conference.

Surplus Marketing Administration authorities, in earlier discussion of extension of the food stamp plan, cited figures collected by the Bureau of Labor Statistics and Bureau of Home Economics in cooperation with the National Resources Committee which showed that, in 1935-1936, 41.7% of the families in the United States had incomes of under $1000 per year.

Science News Letter, May 31, 1941

PSYCHOLOGY-ANTHROPOLOGY

Food Habits To Be Studied By Research Council Group

THE business man who makes his breakfast of coffee and a sweet roll and the typist who lunches on a "slimming diet" of pineapple and dry white toast will receive the attention of a new committee of the National Research Council devoted to food habits in their relations to national defense.

Acting on the belief of nutritionists that the American dinner table is the first line of defense for democracy, scientists on the Food Habits Committee plan to find out why America's way of eating fails to match up with what modern knowledge of vitamins, calories and minerals has shown is the best diet for building health and morale for an all-out battle of nerves and steel.

Chairman of the committee is Msgr. John M. Cooper, of Catholic University, well-known anthropologist. Personnel of the committee includes, besides other students of man and his folk-ways, psychologists schooled in a knowledge of how habits are formed and changed.

Plans for attack on this vital problem were discussed at a meeting of the committee on May 23 and 24.

The Food Habits Committee is one of two committees formed by the National Research Council to cooperate with the National Nutrition program. The other committee, which deals with the health and agricultural aspects of the program, is the Committee on Food and Nutrition.

The first job facing the Food Habits Committee will probably be to find out by a public-opinion poll, or some other suitable method, the extent to which faulty diets are due to ignorance of modern nutrition, to food superstitions, to individual or group prejudices or to prohibitive prices or unavailability of necessary foods.

With a wealth of oranges and grape-

fruit brimming with vitamin C piled up and going to waste in America, many Americans in remote places have never seen them and have no idea what to do with them. This vitamin is one difficult to provide in adequate amount when citrus fruits are not available. When the Red Cross furnished food to flood refugees in an isolated region of the south, workers found hungry children playing ball with the strange round fruit. One mother complained that she had boiled the grapefruit and she had fried them, but they didn't taste right to her either way.

The diet of these people was limited principally by the fact that they had never encountered most of the wide variety of fruits, meats and vegetables that are available in the city market.

At first they seemed afraid of the unusual diet and refused to touch such strange foods. But after three or four days in the Red Cross camp, they were tasting all sorts of new foods. After six or eight weeks they wanted the recipes for cooking them and, incidentally, reported spontaneously how much better they were feeling.

In the city, national, racial and religious customs give odd turns to the American diet.

Some think the first water in which vegetables are cooked is harmful and must be thrown away. Many believe milk good only for infants or the sick.

The Chinese learned in their own land to drink no milk at all but to feed mothers-to-be on the soft bones of birds or pickled pig's feet. But these people know and like soy beans, an ideal food neglected almost entirely by Americans.

People from the Near East and Poland like a doughnut or bread with coffee for their breakfast.

Food habits are influenced by many other factors besides national or other group customs and folkways. The Food Habits Committee may want to assay the effect of advertising, of food fads, of slimming diets, of popularizing by the movies of boyish-form figures or May West curves as well as the encouragement given certain types of diet by drugstore counters, and handy hamburger shops.

Recent research by psychologists has shown that rats and also men will naturally eat those foods that are best for them and eat as much as they should, provided they have not built up artificial prejudices against some types of food.

Stormy scenes at the table may make young children form dislikes for spinach, carrots, milk and other important foods which well-meaning nurses or mothers insist on their eating at times when they are not hungry. Unappetizing seasoning, sloppy serving, too much cooking may make many individuals finicky about certain foods.

But not all food habits are faulty, by any means. America is a big land. Through the medium of the new Food Habits Committee, New Englanders may learn ways of eating that are popular in Texas. Those in the mountains of Kentucky or the woods of Michigan may be told of the golden fruits of Florida and California. Rice eaters will learn of potatoes. Child coffee drinkers will learn about fruit beverages and milk. All will learn that use of the new enriched flour and bread will facilitate planning satisfactory diets.

All America will learn how to arm with physical and spiritual health, the best sort of armor for defense of democracy.

Science News Letter, May 31, 1941

PUBLIC HEALTH

Low Income Farm Families Have Many Physical Defects

Only Five Out of Thousand White Fathers and Mothers Are Really in Good Health; Not One Among Colored

ONLY five out of a thousand heads of low-income farm families and their wives are really in good health—free from physical defects, it was revealed to the Population Association of America, in a report from Dr. R. C. Williams, chief medical officer of the Farm Security Administration.

The accumulation of defects and disabilities affecting these people, termed by Dr. Williams "reservoirs of America's defensive forces" because they contribute so much to the numbers of America's young manhood, was brought to light by a health survey conducted last year by the Farm Security Administration.

"So far," Dr. Williams said, "we have found no dramatic results which would show any great number of them dragging along with one foot in the grave.

"But what we are finding is that they have an accumulation of defects and chronic conditions which are not serious enough to keep them from carrying on with their activities but which cause progressive debilitation and, in some cases, partial or total disability."

Of 1,005 heads of white families and their wives, only five were free from defects. Of 111 colored husbands and wives, not a single one was in perfect health.

The average person is handicapped by between three and four physical defects, and even children have two or three apiece. Vitamin deficiencies are extremely prevalent.

In Maine, the eye specialist on the survey staff examined about 350 persons with slit lamp microscopy for evidence of past or present riboflavin (one of the B vitamins) deficiency. Every individual examined showed evidence of an old,

UPBEAT, DOWNBEAT

Both are caught by the new stroboflash cameras, that take pictures on exposures of one thirty-thousandth of a second. That speed makes even the sixty-per-second beat of a whirring hummingbird's wings stand still. These two photographs, taken by Edward R. Osterndorff at the New York Zoological Park, are of a rare Brazilian species known as the Green Emerald Hummingbird.

existing, or healing deficiency. Over 80% showed both old and existing or new signs of deficiency.

Blood plasma studies of 276 individuals, also in Maine, showed plasma ascorbic acid values below 0.4 milligrams per cent in 38% of those examined. Such low values are usually found with vitamin C under-nutrition which, when fully developed, is scurvy.

Decayed teeth were found in 65% of white persons and 73% of colored. It is defective teeth that accounts for the largest percentage of draft rejections this year.

These poor farm people never seem to have teeth filled. Their teeth get holes in them, remain untreated, and finally are pulled out, a dentist for the survey said.

Of 16,000 cases of serious illnesses among the families surveyed, more than half had received no medical care whatever. One out of three births had not been attended by a physician. Yet the total amount of unpaid doctors' bills was close to half a million dollars.

Among the white wives under 45 years old, 41% had been lacerated in childbirth; the figure was 66% for those over 45.

Incidence of syphilis among the white people surveyed was low, only 0.6%. It was ten times as high among the colored families.

Hookworm is a serious problem, but varies in prevalence in different localities from 15% to 38%.

Among 4,333 white persons of all ages in eight states, 48% had defective tonsils.

Families are large among these farm people. More than 43% of the mothers studied had had five or more children and one wife out of every ten had given birth to ten or more children. One mother had 19 children.

Science News Letter, May 31, 1941

HOROLOGY

Seven-Foot Stone Disk Shows Sun Time

A 3300-POUND sandstone sun dial, seven feet in diameter, has just been erected in Mountain View Park, Denver. It is of the equatorial type, instead of lying flat like most such dials—that is, its disk is parallel to the equator.

The gnomon, or pointer for casting the shadow that shows the time, is the stainless steel shaft that supports the dial, passes through its center like a hub, and projects on the other side. The shadow falls on the south side of the dial, shown here, during winter, or between the fall and spring equinoxes. The rest of the year the sun shines on the north side, not shown here.

A student from a nearby school examines Denver's new sun-dial and finds that it's 3:10 p. m.

Stephen A. Ionides, Denver engineer whose hobbies include astronomy, the calendar and time-measuring instruments, designed the dial at the request of George E. Cranmer, Denver's manager of parks and improvements, who saw a dial like this once in the Far East.

Mr. Ionides said there are only four days a year when the dial and a watch will agree exactly on the time. In the middle of February, a watch will be 14 minutes and 20 seconds faster than the time shown on the dial; in November, the watch will be 16 minutes and 20 seconds slower than the dial.

Science News Letter, May 31, 1941

BOTANY

Mysterious Chinese Drug Proves New Plant Species

Made From Lo-Han, Household Remedy for Colds and Digestive Upsets Is a Kind of Gourd Cured by Heat

"LO-HAN," widely used Chinese drug of hitherto mysterious origin, has finally been traced to its origin, proved to be a new plant species, and given a name of its own, by Dr. Walter T. Swingle of the U. S. Department of Agriculture.

The drug, widely used in China and in Chinese communities in this country as a household remedy for colds, sore throat and minor digestive upsets, is a kind of gourd, cured by heating over a slow fire. Its pulp, intensely sweet, is used in making a kind of sweet soup, not palatable to most Occidentals. The fruits command a high price—about 20 cents apiece in Chinatown stores in this country.

An expedition sponsored by the National Geographic Society finally traced the lo-han to its lair. It is not grown by Chinese, but by a primitive people known as the Miao, in the rainy mountainous interior province of Kwangsi.

The lo-han fruits are produced by vines, of which only the ones bearing female flowers are cultivated. The Miao, primitive though they are, have learned

the trick of hand-pollinating the female flowers with male flowers gathered wild in the woods. They sell about a thousand tons of the fruits annually to Chinese merchants, for transport to the coast cities and for shipment abroad. The flowers are described as an inch and a half or more in diameter, with yellow corollas. The fruits, when fresh, are greenish yellow or dull reddish brown, ranging from hen's-egg to goose-egg size.

The plant has been identified as a member of a large genus that ranges throughout the Old-World warm lands, known as Momordica. Dr. Swingle has named the new species Momordica Grosvenori, in honor of Dr. Gilbert Grosvenor, president of the National Geographic Society, who, he states, "for many years has encouraged liberally the geographic and botanical exploration of China." The new name and a technical description are published in the Journal of the Arnold Arboretum of Harvard University.

Science News Letter, May 3, 1941

PHYSICS

Light Falling on Diamond Is Changed In Wavelength

Phenomenon Called Gateway to Fundamental Knowledge Of Highest Value by Prominent Indian Scientist

CHANGE in color, or wavelength, of light when, for example, it falls on a diamond, and is scattered by it, is proving "a gateway to fundamental knowledge of the highest value," regarding the structure of matter in the solid state. So stated Sir Chandrasekhara Venkata Raman, leading Indian physicist, director of the Indian Institute of Science at Bangalore, Mysore, who was awarded the Franklin Medal of the Franklin Institute.

Since he was unable because of war conditions to come from India, the medal was received on his behalf by Sir Gerald Campbell, British minister to the United States. In a paper sent by Sir Chandrasekhara, a summary was given of some of his important researches.

"A transparent crystal traversed by a beam of light exhibits an opalescence due to diffusion of the light by the ultimate structure of the solid," he said. "The phenomenon is strikingly evident when a beam of sunlight traverses a block of transparent ice. It is often possible to find extensive portions in a clear block of ice which are quite free from inclusions, and the track of the sunbeam through such regions appears of a sky-blue colour, the intensity of the opalescence being about 30 times greater than the intensity of a similar track in dust-free air, but only a fraction of its intensity in dust-free water. The finest specimens of transparent quartz exhibit a similar effect, the opalescence, however, being less intense than in ice."

Early in 1928, Sir Chandrasekhara continued, he found that when a crystal, or a liquid or solid, was illuminated by light of but a single wavelength, as from a mercury lamp, the light which was scattered included other wavelengths. These were revealed by the spectroscope. The difference in wavelength was found to be characteristic of the substance.

This, of course, is quite different from the colors which one sees in a crystal such as a diamond, when white light shines on it. In that case, all the colors visible are contained in the original illumination.

"On the principles of the wave-theory of light," he stated, "an ideal homogeneous crystal cannot scatter light." However, he proposed that a pulsation of the network of atoms which make up a crystal might cause such scattering if it took place in a certain relation to the light falling on it.

The wavelength shift in a diamond was studied as its temperature was raised. There was a change in amount of the shift, because the diamond expanded, and the light had a greater thickness to penetrate. However, there was no increase in the brightness of the altered color, as there would had it been due primarily to the effect of heat. Consequently, Sir Chandrasekhara concludes that the pulsations in the crystal which cause the scattering of light are caused by the light itself.

From these researches, he declared, it is possible to learn important information about the way matter is put together in the solid form.

Science News Letter, May 31, 1941

POPULATION

American Republic That Never Saw Census Man

AN American republic that has never seen the census man was described to the Population Association of America by Dr. Forrest E. Linder, technical expert of the U. S. Bureau of the Census.

In Haiti, the little country whose people have never been counted, the difficulties which would face a census enumerator would be enormous, Dr. Linder said.

The Island of Haiti is extremely mountainous, rising in some places to almost 9,000 feet, and is covered with a dense tropical vegetation so that travel in many parts is almost impossible.

There are roads, mostly on the coastal plains or near the large cities. But Dr. Linder explained, Haiti has had a long history of wars and revolutions, during which the fighting armies would sweep along the principal roads and travel lanes, burning and destroying the homes and crops of the peasants. For this reason the Haitian peasant has traditionally avoided building his home along the highways. Instead, he hides it away from the roads, behind trees or rocks.

A mountainside, Dr. Linder said, might be very densely populated and yet on first glance no sign of human habitation can be seen.

"In Haiti," he declared, "one can stop in the midst of a dense and apparently uninhabited jungle. Soon he will be surrounded by a group of curious Haitians who seem to have come from nowhere, but who actually live within a short radius."

In addition to these obstacles, the attitude of the Haitian peasant would stand in the way of a census taker. Illiterate and suspicious, Haitian peasants assume that any counting will involve something to do with taxes or the army.

Lack of a census in Haiti is but one of many factors that make it difficult for the statistician to obtain any true picture of the population of the Caribbean area, Dr. Linder told the meeting. In the many different government units of this area, the population data collected, methods of obtaining them, and accuracy of the results are different.

Illiteracy interferes with the collection of facts about the population. This is estimated (or guessed) to be as high as 95% in Haiti, 86% in Guatemala, 72% in Venezuela and Nicaragua, 67% in Colombia, 47% in Jamaica and 24% in Costa Rica.

Science News Letter, May 31, 1941

CHEMISTRY

$8,500 in Fellowships Given by Lalor Foundation

FOUR fellowship awards for researches in chemistry and biochemistry were announced by Dr. C. Lalor Burdick, secretary of the Lalor Foundation, maintained through funds contributed by the Lalor family.

Three of the fellowships, for $2,000 each, were granted to Frederick W. Barnes, Jr., for studies on intermediary metabolism with the aid of isotopes to be made at Columbia University; to Robert B. Carlin, for work at the University of Illinois on the chemical structure of poisons extracted from certain "loco weeds"; and to William W. Rice, to work at Harvard University on adsorption of gases by various materials.

In addition, A. Calvin Bratton was given $2,500 for a two-years' research at the Johns Hopkins University Medical School on the curing effects of drugs like sulfanilamide.

The four appointees were selected from a group of 30 qualified applicants. Since the Foundation was established in 1935, 30 fellowship awards, totalling $63,500, have been made.

Science News Letter, May 31, 1941

ENGINEERING

15,000 Volts of Static Formed On Automobile

CHARGES of static electricity amounting to 12,000 volts or more are formed on automobiles driving along a dry road, Prof. Robin Beach, electrical engineer of the Polytechnic Institute of Brooklyn, has found by actual measurements in his own car, equipped as a travelling laboratory.

Possible danger from this source, in starting a fire of gasoline vapor if a spark is discharged, is indicated by his finding that, even with a stop of 20 minutes, there was sometimes no apparent decrease, indicating that many hours might be required before the charge was completely dissipated.

He also found that a "drag" chain, like that which dangles from the rear of a gasoline truck and supposedly prevents a dangerous charge from accumulating, had no noticeable effect.

"Since the pavement was not grounded but rather comprised a most excellent insulator, the drag chains, obviously, could not be expected to discharge the car," he declares in a report to the technical journal, *Electrical Engineering*.

The charge comes, apparently, from the transfer of electrons in two materials that are in "contact," but really separated by a hundred millionth of an inch or less. This occurs between the tires and the road surface, as well as between one's shoes and a heavy carpet, when one's body can accumulate a charge sufficient to make a sizable spark when a finger is brought near a grounded metal object. In the latter instance, he says, a charge of as much as 10,000 volts may be accumulated. Voltages up to 75,000 have been recorded, he says, in the case of gasoline and other liquids passing through pipelines, making a potential source of great danger.

The friction of rubbing does not produce the charge, Prof. Beach states, but merely establishes more extensive contact between the two materials.

Science News Letter, May 31, 1941

MEDICINE

Bigger "Catastrophe Units" For New York City Urged

A TOTAL medical defense plan for New York City which would enlist every available physician in its new "catastrophe units" is urged by the Medical Society of the County of New York. (*New York Medical Week*.)

Greater New York has already been divided into 12 medical defense areas, each with a hospital as its master unit center, and with physicians and nurses trained and equipped to handle any medical or surgical emergency which air raids or other disaster might bring. Other hospitals in the zone will cooperate with the master unit, furnishing ambulances and other service in the event of need.

The catastrophe units according to present plans would have a team of four to 12 physicians, captained by a surgeon, for each of the 12 units.

"In the event of an aerial bombardment or other large-scale catastrophe the present disaster crews would be a drop in the bucket," the medical journal declares. "Every medical man in the city would be required to cope with the situation.

"In case of a disaster many practitioners would be called upon to perform tasks beyond the scope of their present training and experience. If we are serious in our preparations for a possible danger, every physician available for home medical defense should be trained in the correct principles of emergency repair."

Science News Letter, May 31, 1941

IN SCIENCE

GENERAL SCIENCE

Magnet Device Stops Balance From Swinging

A DELICATE balance for weighing minute quantities in the chemical laboratory has a magnet device to stop it from swinging. This is done with a copper plate moving between the poles of a powerful permanent magnet. Because of eddy currents set up in such a plate, and their reaction with the magnetic field, it moves through the field like a knife in cheese. With the balance device, the amount of slowing, or damping, may be carefully adjusted. (*Scientific Glass Apparatus Co.*)

Science News Letter, May 31, 1941

ENTOMOLOGY

Great Migratory Flight Of Butterflies Seen

ONE of Nature's most mysterious phenomena, a mass migration of butterflies, has just taken place over thousands of square miles in Colorado.

For several days, over a front extending at least from Denver to Colorado Springs, or about 80 miles from north to south, the butterflies have been drifting steadily and irresistibly east by millions into the Great Plains from the direction of the Rocky Mountains.

Victor F. Lotrich, state archaeologist of Colorado, and also a skilled entomologist, drove from Denver to Colorado Springs, and saw the butterflies everywhere. He caught a couple on the outskirts of Denver, and identified them as the Painted Lady or thistle butterflies, one of the most common varieties, reddish-brown with white-spotted wings.

When he released his little prisoners near Colorado Springs, 75 miles to the south they fluttered for a moment, then headed east again, Mr. Lotrich said. He thinks they may have come from the western slope of the Rockies. Several years ago he saw millions of the butterflies crossing Monarch Pass, 10,800 feet high on the Continental Divide from west to east. He thinks they were so numerous then because they sought this gap in the mountains, between 14,000-foot peaks that barred their passage.

Science News Letter, May 31, 1941

NCE FIELDS

PLANT PATHOLOGY

Disease of Cherry Trees Appears in Oregon

A NEW disease of cherry trees, which causes a loss of green color along the leaf veins and a general mottling of leaf surfaces, has been detected by S. M. Zeller and A. W. Evans of the Oregon Agricultural Experiment Station. (*Phytopathology.*)

Prunes as well as cherries, both important commercial crops in the Pacific Northwest, are attacked, the two plant pathologists report. The disease has also been found on ornamental flowering cherry trees, on Italian prunes, and on several species of wild cherry.

Cause has been identified as a virus, which can be transmitted along with grafts from diseased stocks.

Science News Letter, May 31, 1941

PHYSICS

Invisible Tattoo Marks Revealed Only by X-Ray

INVISIBLE tattoo marks, which appear under the influence of X-rays, may aid in the identification of soldiers killed in future wars. They might be used to "brand" habitual criminals or sex offenders, or placed near surgical scars to enable a physician to determine accurately the case history of a patient without relying upon his own statements.

Such marks can be made with compounds known as phosphors, which shine with various colors when activated by X-rays. Ordinarily, when tattooed into the skin, they would be completely invisible, say the inventors of the method, Dr. Henry C. Dake and Jack De Ment, of Portland, Ore. Phosphors such as cadmium borate, which glows red, and zinc orthosilicate, which gives off bright green light under the X-rays, are said to be especially effective on the skin of Negroes.

So long as the skin remains on the body, the marks can be detected, it is stated. Ordinary methods of removing tattoo marks, by injecting zinc chloride, making them slough away, are not effective for these, Dr. Dake and Mr. De Ment declare, for even minute amounts of the pigment remaining in the skin are clearly revealed by the X-rays. Only a surgical operation, completely removing a section of the skin, will eradicate them.

Science News Letter, May 31, 1941

RESOURCES

Central America to Supply Much of Quinine Needs

QUININE, like rubber, is coming back home to the Western Hemisphere. Paul C. Standley, herbarium curator at the Field Museum of Natural History, has just returned from an expedition to Guatemala, and reports that large plantations of cinchona trees, source of quinine, have been set out, financed by American capital. They will be able to produce a large supply of the best grade of quinine.

Tea, native to the Orient, has become a naturalized Central American citizen, Mr. Standley states. The only commercial tea plantations in the New World are in Guatemala, and they are capable of great expansion if need arises.

Mr. Standley's principal task in Guatemala was the collecting of specimens of the native flora, to serve as material in the preparation of a new monograph on the plant life of that country, which he is preparing in collaboration with his colleague, Dr. Julian A. Steyermark. He has brought back with him about 30,000 pressed plants, which will be added to the Museum's already great collections of Central American flora.

Science News Letter, May 31, 1941

AGRICULTURE

Peru Joins Ranks of Flax-Raising Countries

FLAXEN cords are strengthening the bonds of good neighborship between the Americas. Peru is the newest South American country to join the ranks of fiber flax raisers, with a crop of about 500 tons now being harvested, the U. S. Department of Agriculture states. Seed from the United States and Canada has been purchased for next year's sowing.

Although considerable flax is now being grown in this country, the domestic crop comes nowhere near supplying the demand, which amounts to as much as 7,000 tons a year. Since most of this came from Europe, there is a wide market for South American replacements in this commodity.

Science News Letter, May 31, 1941

PLANT PATHOLOGY

Calomel Found Preventive Against Crown Gall

CALOMEL, standby of old-fashioned medicine chests, has been found an excellent preventive of one of the worst of plant diseases, crown gall, by E. A. Siegler and J. J. Bowman of the U. S. Department of Agriculture. Crown gall is a germ-caused cancer-like growth that afflicts roots and stems of plants, and has long been a cause of serious loss in young nursery stock.

The two scientists first found calomel effective against crown gall in peaches. Now they report that plum and cherry seedlings can be protected by dipping the pits into water containing calomel before planting. A similar treatment protects the cut surfaces on root-pruned young trees kept in storage over winter.

Calomel's effectiveness is presumably due to the fact that it contains mercury, which in compound is a good disinfectant. Since calomel is insoluble in water its action is slow, extending over a considerable period of time. In using, it is shaken up in water to form a cloudy suspension, rather than a true solution, and the seeds or root surfaces to be protected are given a thin coating of solid calomel particles.

Science News Letter, May 31, 1941

BIOLOGY

3-Day-Old Chick Embryos Foster-Mothers to Mice

MOUSE embryos in the seventh and eight days of prenatal development were "adopted" by chick embryos of less than half their age, and lived for 48 hours on the nourishment supplied by these strange foster-mothers, in experiments in the zoology laboratories of Columbia University, reported (*Science,* May 23) by Dr. S. Gluecksohn-Schoenheimer.

Windows were cut in the incubating eggs, exposing the embryos within. Tiny, week-old beginnings of mice were removed from their mothers' bodies, and by an almost unimaginably delicate operative technique planted upon the chick embryos. Forty-eight hours later they were seen to have become nearly normal mouse embryos of typically ninth-day stage of development, with normally beating hearts.

Further experiments are now in progress.

Science News Letter, May 31, 1941

ASTRONOMY

Debut of Venus

A Morning Star During Last Winter and Spring, Beautiful Planet Will Now Shine in Evening Skies

By JAMES STOKLEY

MAKING its debut in the evening sky this month for an appearance which will last until the end of the year and on into 1942 is the planet Venus. During the winter and early spring, it was a "morning star," visible in the east before sunrise. On April 19 it was between sun and earth. Now it has swung far enough east of the sun that it remains on view in the west after sundown.

At the beginning of June, it will be necessary to look to the west while the twilight is still quite bright. But at the end of the month it will have moved far enough away that it will set about an hour later than the sun, and it will be more easily seen. In succeeding months, it will continue to draw from the sun, and to brighten, making it a most brilliant object at Christmas time.

In the early part of June, the innermost planet, Mercury, is also visible for a few days, around the fifth of the month. It is in the west, a little to the north of the west point, under the star Pollux, which is shown on the maps. On these the heavens appear as at 10:00 p. m. at the beginning and 9:00 p. m., at the middle of June, in local standard time.

Most prominent stars of June are on view in the south and east. Brightest is Vega, in Lyra, the lyre, high in the east just above the northern cross of Cygnus, the swan. Second brightest is Arcturus, high in the south in Bootes. Below it is Virgo, the virgin, with Spica, another bright star. Antares, red in color, to the southeast, marks the scorpion, which will be prominent in the evening skies of mid-summer.

On Saturday, June 21, at 2:34 p. m., eastern standard time, the sun reaches its farthest north in the sky, and summer commences in the Northern Hemisphere. South of the Equator, it is the beginning of winter.

The planet Mercury, which makes its best appearance of the year this month, is by far the most elusive of the five visible to the naked eye. Mars, now seen in the east after midnight, Jupiter and Saturn, which are too close to the sun to be visible at all this month, are able to come into plain view at any time of night. Venus becomes most brilliant of all, and frequently appears either for several hours before sunrise, or an equal time after sunset.

But Mercury is never above the horizon when the sky is really dark. Always it is seen, if at all, in the twilight of morning or evening. This is because Mercury, innermost of all the planets that revolve about the sun, is on the average 36,000,000 miles from the central fires of the solar system. However, its orbit is the least circular of all the planets except Pluto. It can approach to within 28,550,000 miles of the sun, or recede to a distance of 43,350,000 miles. Every 88 days it makes a circuit of the sun, but in this time the earth has made about a quarter of its own round trip. Every 116 days, consequently, Mercury catches up to us.

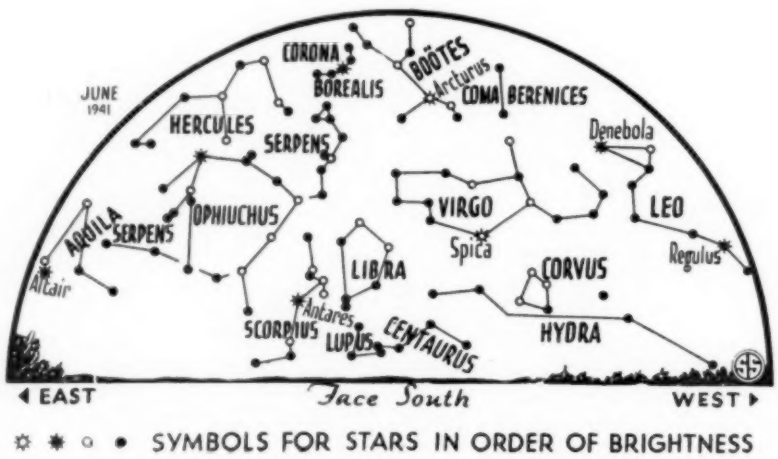
If we could watch the sun and Mercury continually as they travel across the sky, we should see the planet making a loop around the sun once in this 116-day period. At one time it would be farthest to the west (this is called its "greatest western elongation"). Then it would pass behind the sun, and reach its farthest to the east (greatest eastern elongation). In the former position, it is a morning star. In the latter, as this month, it remains in the sky after the sun, and is an evening star. Even at best, it cannot get more than 28 degrees (slightly less than a third of the way from the horizon to the zenith) away from the sun. It is a little less than 24 degrees from the sun at this June elongation.

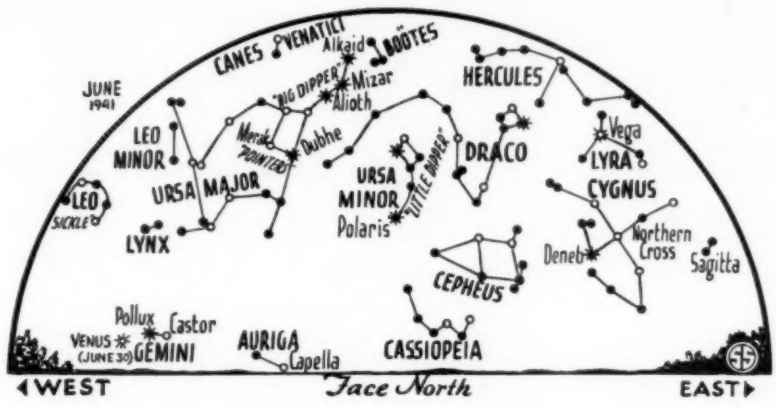
Darkness does not come until the sun is 18 degrees below the horizon, so even if the planet were directly above (as it could be only near the tropics) it would only be a few degrees high when the sky was really dark. Then the difficulty of seeing a star or planet very low, because of the absorption by the atmosphere, would make it quite invisible.

But, this month, especially about June 5, and even for as much as five days before or after, it may be glimpsed low in the western sky, about a fifth of the way around from the west to the north point of the horizon, while darkness is falling.

In the same way that the moon always presents the same side to the earth, so does Mercury always have the same half to the sun, an effect of the braking action of tides during past ages. Thus, one part of Mercury, the sunlit hemisphere, is extremely hot; above the melting point of lead. The other hemisphere, where the sun never shines, is so cold that helium gas would freeze. It is almost at the absolute zero of outer space —460 degrees below zero. Because of the small size of Mercury, about 3,000 miles, it does not have enough gravitational pull to hold an atmosphere even if it should be given one, so it is hardly a comfortable place to live!

Science News Letter, May 31, 1941





Celestial Time Table for June

Monday, June 2, 4:56 p.m., Moon at first quarter. **Thursday, June 5,** 11:00 p.m., Mercury farthest east of sun. **Saturday, June 7,** 9:00 p.m., Moon nearest; distance 223,800 miles. **Monday, June 9,** 7:34 a.m., Full moon. **Monday, June 16,** 4:24 a.m., Moon passes Mars; 10:45 a.m., Moon in last quarter. **Friday, June 20,** 2:00 a.m. Moon farthest; distance 251,900 miles; 7:00 a.m., Venus passes Mercury. **Saturday, June 21,** 2:34 p.m., Sun farthest north, summer commences. **Tuesday, June 24,** 2:22 p.m., New moon. **Wednesday, June 25,** 12:54 p.m., Moon passes Mercury. **Thursday, June 26,** 5:50 a.m., Moon passes Venus.

Eastern standard time throughout.

GEOLOGY

"Reverse Matter" Theory of Meteorites Called Unnecessary

THE theory of meteorites made of "reverse matter," which explode and vanish when striking ordinary matter, is not necessary to explain the failure to locate meteoritic fragments around certain craters which seem to have been produced by the impact of giant masses of stone or rock from the sky, says Dr. H. H. Nininger, director of the American Meteorite Laboratory in a report to the Society for Research on Meteorites.

The theory of reverse, or "contraterrene," matter was proposed about a year ago by Dr. Vladimir Rojansky, of Union College. Ordinary matter is made of atoms having nuclei of positively charged protons, and negatively charged electrons revolving around them. Contraterrene atoms, on the other hand, if they exist, have negative nuclei and positrons, electrons with positive charges, revolving around. If ordinary and contraterrene matter were to come into contact, the charges would cancel, and both would disappear in a violent outburst of energy.

Following this proposal, it was suggested by Dr. Lincoln La Paz, of Ohio State University, and also by Dr. Samuel Herrick, Jr., of the University of California, Los Angeles, that contraterrene meteorites sometimes land on the earth. Dr. La Paz's idea was that they might have caused craters like those at Tunguska, Siberia, which seem to have been the result of meteoritic impact in 1908, even though expeditions have found no meteorites in the vicinity.

Dr. Herrick made the proposal that a contraterrene meteorite was responsible for the "phantom Bertha," last summer, when a boating party in Long Island Sound were startled by what seemed to be a shell fired across their bow, hitting the water and exploding nearby. It was shown, however, that it could not have been a shell.

Without commenting on whether or not contraterrene matter may exist, Dr. Nininger declares that either the meteorless craters or the mysterious "shell" can be explained "without assuming the existence of any such purely hypothetical material." He says that if even the famous Arizona meteorite crater, near which many tons of meteorites have been found, had been formed in a partly swampy and wooded area, like that of central Siberia, probably not a single meteorite would have been found.

The story of the "phantom Bertha," he declares, "is entirely consistent with an ordinary daylight meteorite fall, such as hundreds that have been related either in the literature on meteorites or to the writer in conversation with witnesses of such events."

"We should never be afraid to look for new facts or new explanations," Dr. Nininger concludes, "but, so long as well-established facts are sufficient to explain a given set of phenomena, we are surely courting a return to the days of 'spirits and mystery' when we shrink from painstaking or even back-breaking investigation and seek refuge in untried hypotheses, especially when these hypotheses rest entirely on assumptions."

In a later report to the Society for Research on Meteorites, Dr. La Paz answers Dr. Nininger, and defends his hypothesis. The Russian Academy of Sciences, he says, "sent well-organized expeditions, elaborately equipped with excavating tools, drills and modern geophysical equipment," to the Siberian site to search for meteorites. Their methods, he states, were essentially similar to those used successfully to hunt for meteorites in Arizona.

"On the basis of discoveries actually made at the Arizona crater," he declares, "there can be no reasonable doubt that intensive searches made by Russian scientists would have resulted in the recovery of meteoritic material if, as Nininger asks us to imagine, the Canyon Diablo rather than the Podkamennaya Tunguska fall had occurred on the Stony Tunguska River in 1908."

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From Page 339

and butter, meat, and potatoes, and so on, it was discovered that some of the standards set could not be supplied from any combination of foods that the majority of people were able to get. So the scheduled announcement was cancelled and the whole problem restudied. Now the National Research Council's committee on food and nutrition, representing doctors, nutritionists and public health authorities among others, is satisfied that it has standards which will guide us to fitness for defense along the diet route.

The yardstick, translated from laboratory terms, was announced by Dr. Lydia J. Roberts, head of the department of home economics of the University of Chicago, at the National Nutrition Conference for Defense called by President Roosevelt. Here it is:

One pint of milk daily for an adult, more for children.

One serving of meat.

One egg daily, or some suitable substitute such as beans.

RADIO

Dr. W. W. Bauer, director of the American Medical Association, will discuss with Miss Jane Stafford, Science Service medical writer, research being reported at the meeting of the Association, as guest scientist on "Adventures in Science," with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Thursday, June 5, 3:45 p.m. EDST, 2:45 EST, 1:45 CST, 12:45 MST and 11:45 a.m. PST. Listen in on your local station. Listen in each Thursday.

Two servings of vegetables daily, one of which should be green or yellow.

Two servings of fruit daily, one of which should be a good source of vitamin C, such as the citrus fruits or tomatoes.

Bread, flour and cereal, most and preferably all of it whole grain or the new, enriched bread, flour and cereals.

Some butter or margarine with vitamin A added.

Other foods to satisfy the appetite.

Total number of calories are set at 3,000 for a moderately active man and 2,500 for a moderately active woman.

Cheaper cuts of meat, Dr. Roberts reminded, are just as nourishing as the more expensive ones.

Many people, in fact the majority of Americans follow this pattern now in planning their daily diets. They do not always quite come up to the yardstick, however. The green vegetable, Dr. Roberts pointed out, may only be a scrap of lettuce under a salad, and even if a more generous serving is given, it may not all be eaten.

Defense on the nutrition front calls for actually eating daily the food allowances set by the new yardstick.

The minority who do not now get meals up to the yardstick make up about one-third of the population. Plans are being considered at the Conference to help them bring their daily meals up to defense diet standards.

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BOOKS

SCIENCE NEWS LETTER will obtain for you any American book or magazine in print. Send check or money order to cover regular retail price and we will pay postage in the United States. If price is unknown, send $5 and the change will be returned. When publications are free, send 10c for handling. Address:

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ENGINEERING

Electrical Currents Prevent Corrosion of Submerged Pipes

All Corrosion of Pipe in Contact With Water or Moist Earth Is Caused by Electrolytic Action

HOW electric currents can counteract the process by which submerged pipes act as parts of an electric battery and are corroded was described to the meeting of the American Petroleum Institute by N. A. Miller, of Universal Oil Products, Inc.

Mr. Miller declared that all corrosion of metal in contact with water or moist earth takes place by just one means, that of electrolytic action. In this process, the metal pipe or other structure forms one pole of a battery. The other pole may be formed by another metal, or spots of impurity or mill scale on the first. Current flows from the anode to the cathode, and the former is gradually consumed.

To counteract this process, the current must be made to flow the other way. Sometimes pieces of other metal are placed nearby, which will become anodes more easily than the metal to be protected. Then, the latter becomes the cathode, and is not corroded. But still better is the application of a direct electric current to flow in the proper direction.

Mr. Miller described installations of such a system by oil refineries, especially in pipes of open tank condensers. Though the operating records are meager, he stated, "what information we do have indicates positive beneficial results." He urged further investigation of the subject, and pointed out that records available concern locations where corrosion was initially very bad.

"Additional data are necessary to establish the economics involved in the border-line cases," he concluded.

Science News Letter, May 31, 1941

Living Organisms Blamed

BACTERIA and other living organisms are responsible for some kinds of corrosion, which may affect nonmetallic as well as metallic objects. W. J. O'Connell, Jr., of the technical division of Wallace & Tiernan Products, Inc., told the meeting about these pests, and methods of combating them.

One kind, for example, affects concrete. The bacteria produce hydrogen sulfide gas, which reacts to produce sulfurous or sulfuric acid, either of which will attack the concrete.

He pointed out that methods for controlling these organisms are well known, but that attention must be paid to physical, chemical, electrochemical, biochemical and biophysical aspects of the problem in applying them.

Science News Letter, May 31, 1941

NUTRITION

Feather-Weight Rations For Parachute Troops

FEATHER-WEIGHT rations for ski and parachute troops are being studied by the U. S. Army. Also in the experimental stage are thirst-quenching tablets for soldiers on the march.

Describing these newest tight-packed foods, Miss Mary Barber, food consultant to the Quartermaster General's office, emphasized that research to perfect them is still going on, and the foods are not yet accepted for Army use.

A sample of the emergency ration for ski and parachute troops resembles a slab of brown toast. It will probably contain pemmican, which is jerked meat, and also whole wheat flour, soy flour, and molasses. It will provide about 450 calories for energy, which, as army rations go, is a "light lunch."

Anti-fatigue tablets with which the Army is experimenting contain dextrose, which is fruit sugar and a good source of energy. They also contain citric acid and vitamin B1. They stimulate the flow of saliva, Miss Barber pointed out, and serve to relieve thirst on the march. Evolving its anti-fatigue tablets, the U. S. Army has studied foreign special rations, including some furnished German troops.

Science News Letter, May 31, 1941

Selected *Indians* at several CCC training centers are being taught modern signaling methods, important in defense.

6 THINGS of Science

unexpected surprising valuable
extraordinary unusual remarkable
informative strange scientific

FABRICS UNIT

You get a piece of cloth made from salt, coal, lime and air. You get a piece of textile woven from fibers of spun glass. You get a small piece of synthetic fur made from cat tails. You get a small piece of synthetic wool made from milk, produced in Italy and Germany for use in clothing. You get a piece of paper that looks and feels like cloth. All this in the FABRICS unit of THINGS.

BIMETALLIC UNIT

You get a disc and a strip of metal, each of which looks like one metal but is actually composed of layers of two! You get instructions for three surprising experiments with them. In your own home such bimetal is now in use in from ten to fifty pieces of equipment! In your car bimetal is used for as many as 13 functions!

METEORITE UNIT

You get two actual meteorite specimens certified to be actual fragments from the heavens such as can usually be viewed only in museums. You get some of the sand pulverized by the tremendous *impact* of one of the largest meteorites ever to hit the earth.

FINGERPRINT UNIT

You get an inkless fingerprinting outfit with material good for many impressions. Included are two purse fingerprint cards that may some time be useful to you in cashing a check, two official fingerprint record documents, and full experiment instructions, with information *how to classify* the arches, loops, whorls and composites in your own or any fingerprint.

SYNTHETIC RUBBER UNIT

You get a piece of rayon web treated with the magic plasticized poly-vinyl chloride which makes it waterproof. You get a piece of synthetic rubber made from oil, soap, natural gas and air. You get, for purposes of comparison, a piece of natural rubber. You get instructions for experiments with each of these products.

THE NINE WORDS above, describe the THINGS of science now available, about as accurately as *mere words* can describe this *intriguing* collection. Look at the description in the column at the left for detailed information.

These THINGS of science are now in the hands of members of the new organization of friends of science sponsored by Science Service, the Institution for the Popularization of Science. They are distributed without profit.

There are still a few memberships available before the 1941 roster must be closed. As a reader of SCIENCE NEWS LETTER you are invited to take advantage of the following offer:

Immediately on receipt of your Application (*see coupon below*) we will send you the five units of THINGS of science described at the left. Toward the end of June, we will send you the sixth unit, on "ORES OF STRATEGIC MINERALS."

To conserve expenses in this non-profit organization, members send us the remittance with the Application. Or, you can pay the Postman.

After you have received the units and have seen how they satisfy your intellectual curiosity about a wide range of objects, you will be given an opportunity to extend your membership to the end of 1941 at the same non-profit rate of $2 for the six units to come, from July through December 1941.

Send in the Application form *promptly*, please. There are only 741 first-half 1941 memberships now available.

This announcement you are reading is now in the hands of more than 35,000 SCIENCE NEWS LETTER readers. So we suggest that you send in your Application *right away*. If you are farther away from Washington than over-night by rail, we suggest that you send your Application BY AIR MAIL!

APPLICATION for THINGS units

To *Things*

2101 Constitution Avenue, Washington, D. C.

I hereby apply for membership in your new science group *. You are to send me the five units described above, *immediately*, and later in June you are to send me the sixth unit.

☐ I enclose $2 with this Application. (We pay all postage charges when $2 is sent with Application.)

☐ When the Postman delivers the five units, I will pay him $2 plus the few cents postage charges. The June unit is to follow along a little later in the month, without additional cost to me.

Name _____
Please write plainly

Complete Mailing Address _____

_____

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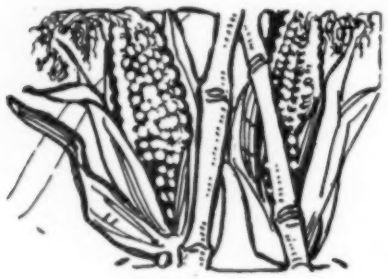
* It is understood that the individual sending in this Membership Application is to be given an opportunity to extend his membership upon payment of an additional $2 before July 1, so that he can receive the six units to be dispatched once each month from July through December, 1941.

AGRONOMY

NATURE RAMBLINGS
by Frank Thone



Ailing Plants

WHEN a child looks "pale and peaked," his elders are apt to judge that he needs iron. When a plant's leaves look the same way, lacking their healthy deep green color, the trouble may be a lack of the same element.

Doctors of human ills have an advantage over doctors of plant ills. Their patients can talk and tell where it hurts. Plants can only mutely wave distress signals in leaves and stems and flowers and fruits, and leave it to their human attendants to diagnose the symptoms as best they can.

A new book, *Hunger Signs in Crops*, written by a committee of 14 specialists and edited by Gove Hambidge, has just been published (*Reviewed, SNL, this issue*). It describes and depicts in color some of the principal types of malnutrition in plants and tells what can be done about them.

Different plants naturally show different symptoms for the lack of any given mineral element, but there may be at least some general resemblances. Thus nitrogen starvation manifests itself as a yellowing of the leaves in several different species; most prominently along the midrib, in corn; entire lower leaves on the stalk, in tobacco; a dirty yellowish-green tinge, in cotton leaves. Other deficiencies also manifest themselves in this similarity-with-differences pattern.

Of particular importance nowadays is research on effects of shortage in the so-called trace elements—mineral nutrients needed only in exceedingly minute amounts, but indispensable in those amounts. Until a few years ago, it was thought that plants needed only seven mineral elements: nitrogen, potassium, phosphorus, sulfur, magnesium, calcium and iron. Needs for the first six of these are measurable in scores of hundreds of pounds per acre of crop.

But to the seven elements of classic plant physiology there have now been added another six: manganese, boron, chlorine, iodine, zinc and copper. The need for these, per acre of crop, is measurable in ounces: the equivalent of a quarter of a pound of borax, enough iodine crystals to make up one ounce of tincture, and so on. Discovery of the necessity of these trace elements has been so recent, and research results are still coming in so fast, that all statements about them must still be regarded as provisional. This new book, however, does bring together all pertinent present information on the subject.

Science News Letter, May 31, 1941

PSYCHOLOGY

Experiments Throw Doubt On Function of Frontal Brain Area

Experiments Show That Monkeys Without Important Brain Area Able to Act in Ways Formerly Thought Impossible

THE EXACT function of the important frontal areas of the brain is thrown in doubt by the discovery by Dr. R. B. Malmo, of the Yale Laboratories of Primate Biology, that monkeys without this part of the brain can remember.

Dr. Malmo described his experiments to the Eastern Psychological Association meeting at Brooklyn College. Caged in a dark room, the monkeys could see an illuminated glass and learn to reach food by pushing the glass when the light came on. They learned to distinguish between an illuminated glass and one that was dark even when their relative positions were changed.

Then came the critical experiment. The glass behind which was the food was lighted as usual, but this time a wire screen kept the monkey from reaching it immediately. He had to wait and remember where the light had been for an instant before the screen was raised and he could reach for his reward.

This is the sort of memory that has been thought impossible without the brain's frontal areas.

But these monkeys with no frontal association areas could do the trick. They could wait 2 seconds, 3 seconds and finally as long as 10 seconds, and still reach correctly and get the food. One animal's score was 81%, the other's 94%.

These scores were possible, however, only if the animal waited in the dark for the screen to rise. Turning on a ceiling light for five seconds in the middle of his wait brought the score down to 50% for one animal and 46% for the other. These are chance scores indicating no mastery of the trick.

Loss of the frontal association areas, Dr. Malmo suggests on the basis of his monkeys' achievements, makes an animal or a human patient more susceptible to that sort of forgetting which is due to a crowding out of mind by new happenings.

It does not seem to destroy his ability to hold things in mind if he is not distracted.

Science News Letter, May 31, 1941

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Additional Reviews On Page 352

MILITARY SCIENCE—ECONOMICS

STRATEGY OF THE AMERICAS—Fleming MacLiesh and Cushman Reynolds—*Duell, Sloan and Pearce,* 247 p., $2.50. Where the danger lies, how it can be averted or encountered, set forth fully in a clear, non-technical discussion. Ground covered includes industrial and economic defense as well as straight-out military and naval measures. Good reading for the times.

Science News Letter, May 31, 1941

ZOOLOGY

A CONTRIBUTION TO THE KNOWLEDGE OF VARIATION IN *Opheodrys Vernalis* (HARLAN), WITH THE DESCRIPTION OF A NEW SUBSPECIES—Arnold B. Grobman—*Univ. of Mich. Press,* 38 p., 35c.

Science News Letter, May 31, 1941

ECONOMICS

DEVELOPMENT OF RESOURCES AND STABILIZATION OF EMPLOYMENT IN THE UNITED STATES; Part II, Regional Development Plans—National Resources Planning Board—*Govt. Print. Off.,* 285 p., 80c.

Science News Letter, May 31, 1941

MATHEMATICS

THE STEREOGRAPHIC PROJECTION—F. W. Sohon, S. J.—*Chem. Pub. Co.,* 210 p., $4. The stereographic projection, which seems to have been invented about 150 B. C. by Hipparchus, has many points of interest, in addition to its use in map-making. Father Sohon, director of the Georgetown University Seismological Observatory, became interested through its use in earthquake study, and has here written a complete exposition, developing the subject from its foundation.

Science News Letter, May 31, 1941

CHEMISTRY

DANGERS AND HEALTH HAZARDS OF FIRE GASES—Harold Joe Davis—*Pub. by author, 3927 East Admiral Place, Tulsa, Okla.,* 25c.

Science News Letter, May 31, 1941

PHYSICS

VACUUM TUBE VOLTMETERS—John F. Rider—*Rider,* 179 p., illus., $1.50. Among the vast number of applications of the electron tube, one of the most widespread has been in connection with voltage measurements. First used mainly for measuring high-frequency voltages, it is now employed for many other measurements, even of current and resistance. This is a practical exposition of such devices, with full details about the various types.

Science News Letter, May 31, 1941

METEOROLOGY

METEOROLOGY (2nd ed.)—Donald S. Piston—*Blakiston,* 233 p., illus., $3. New edition of a successful brief text for college and aviation school courses.

Science News Letter, May 31, 1941

GEOLOGY

TEXTBOOK OF GEOLOGY; Part II, Historical Geology (4th ed.) — Charles Schuchert and Carl O. Dunbar—*Wiley,* 544 p., illus., $4. That a new edition has had to be produced about every ninth year since this book first appeared in 1915 is sufficient testimony to its value and success.

Science News Letter, May 31, 1941

PSYCHOLOGY

ANIMAL BAHAVIOR, Impulse, Intelligence, Instinct—Johann A. Loeser—*Macmillan,* 178 p., illus., $2. A compact, popularly written (but not "jazzed") presentation of the essential facts about animal behavior, divided into sections on self-preservation, propagation, social impulses and migration. The author, a well-known German scientist, has been in Great Britain since 1938.

Science News Letter, May 31, 1941

MILITARY SCIENCE—ECONOMICS

UNITED WE STAND! Defense of the Western Hemisphere—Hanson W. Baldwin—*Whittlesey House,* 364 p., $3. How can our hemisphere—the hemisphere of all the Americas, North and South—be made secure against those who would encroach upon it? The problem is clearly stated in all its difficulties, what has been done and what must yet be done are equally clearly stated, and the means for carrying out the tasks by citizen and warrior alike are described in terms that all can understand.

Science News Letter, May 31, 1941

GENERAL SCIENCE

INTERNATIONAL SCIENTIFIC CONGRESSES HELD SINCE 1930, OR ANNOUNCED FOR 1941 OR LATER—*National Research Council,* 46 p., 25c. Compiled in the Library of the National Research Council, this list should prove extremely valuable, in spite of the fact that the war has interfered with many congresses.

Science News Letter, May 31, 1941

MILITARY SCIENCE

THE ARMY OF THE FUTURE—Charles de Gaulle—*Lippincott,* 179 p., $2. First translation for American readers of the famous book which General de Gaulle wrote as a guide for the defenders of his native country, but which was rejected by them and became the text of its enemies instead. It is always interesting to read the words of a prophet after his prophecy has come true—even if the reading at the present moment is somewhat grim.

Science News Letter, May 31, 1941

HISTORY

A HISTORY OF CHILE—Luis Galdames; Isaac Joslin Cox, trans. and ed.—*Univ. of North Carolina Press,* 565 p., $5. Fourth in the Inter-American Historical Series, this volume gives to English-speaking readers a history of Chile, by a Chilean. Sr. Galdames' book has already won approval in his own country, where eight editions have appeared. He emphasizes not only military and political events but also social and economic changes which the country has experienced.

Science News Letter, May 31, 1941

RADIO

I LIVE ON AIR—A. A. Schechter and Edward Anthony—*Stokes,* 580 p., $3.75. Relatively uninhibited stuff about how news happenings and public events get to your radio loud speaker, written from the inside of NBC.

Science News Letter, May 31, 1941

AGRONOMY

HUNGER SIGNS IN CROPS, A Symposium—Gove Hambidge, ed.—*Judd and Detweiler,* 327 p., illus., $2.50. See page 350.

Science News Letter, May 31, 1941

★★★★★★★★★★★★★

WYOMING

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